Accounting For Employee Stock Options With Service, Performance, And Market Conditions

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ABSTRACT

The accounting for employee stock options has long been a subject of debate among executives, regulators, and standard-setters. The accounting standard passed by the Financial Accounting Standards Board (FASB) in 2004 allows for more creative design of these types of options. In this case, students learn about employee stock options with service, performance, and market conditions. They also learn how to value options with these conditions, and how to report them on company income statements under the new accounting guidance.

Keywords: Stock Option Accounting; Financial Reporting; Service Condition; Performance Condition; Market Condition

INTRODUCTION

For more than twenty years, various parties debated whether the cost of granting stock options to employees should be recognized as an expense on company income statements. Proposed new accounting rules requiring option fair values to be expensed were under discussion in 2003-2004. One of the most persuasive arguments in support of the new rules was offered on March 3, 2004 in hearings before the U.S. House Subcommittee on Capital Markets, Insurance, and Government Sponsored Entities. Nobel prize-winner Robert Merton stated his view that:

…the past accounting treatment of options versus other forms of compensation has stifled innovation and variety in compensation plans. It is no accident that virtually every company in the past that uses significant amounts of stock options always issues at-the-money options. Performance options and others are not issued, even though many believe they are far better. It could well be that the previous accounting treatment … is important in having created that stifling of innovations.

Merton was referring to the common practice of designing stock options such that the price and the number of shares are "fixed" as of the date of grant. Companies granting "plain vanilla" options such as these benefited from an exception in the accounting guidance that allowed them to avoid the recording of any expense on the company's income statement.

However, as noted by Merton, companies issuing these "fixed" options missed the opportunity to be more creative in the design of executive incentives. For example, the board of directors may believe the company would benefit from tying the number of stock options received to actual earnings growth over time, in order to provide more balanced incentives to management. Alternatively, the board of directors may believe incentives would be improved by tying the option's strike price to a market index, to better reward managers for the value created over and above general market movements. By removing the exceptions noted above, the new stock option expensing rules (e.g., SFAS No. 123R) issued in December 2005 removed incentives not to implement these more creative stock option plan designs.

This case is designed to accomplish three main learning objectives. Students will learn

- How service, performance and market conditions can be included in employee stock options;
- How to value employee stock options with these conditions; and
- How to apply the accounting guidance related to expensing employee stock options with these conditions.

The facts and circumstances (Exhibit 1) and the valuation assumptions (Exhibit 2) should be handed out to students in advance. Appendix A presents the required valuation models that can be easily created in Microsoft Excel. Instructors may decide to create the file in advance and circulate it to students or to let the students create the model. Implementation guidance, case solutions, and student feedback are presented at the end of this article.

EXHIBIT 1

FACTS AND CIRCUMSTANCES

Heyes Curry, CFO of ASJ Inc. is preparing for next week's meeting with the company's compensation consultants to finalize the design of the employee stock options that will be granted to the company's managerial level employees this year. Since the Financial Accounting Standards Board (FASB) changed the accounting rules for employee stock options in 2004, ASJ has been considering changing the design of their options. Specifically, Curry is thinking that it might be good to tie the stock option payoffs to both service and performance. However, he is not sure exactly how best to accomplish this.

The compensation consultant has suggested several alternative approaches. One possibility is to focus primarily on retention by incorporating a service condition so that the options could not be exercised for, say, three years. Another possibility is to incorporate a performance condition such that the exercise price of the option could be changed based on, for example, earnings per share (EPS) growth. Alternatively, the number of options granted could be changed based on EPS growth. A third possibility is to incorporate a market condition, for example, where the option exercise price increases with an overall market index.

Curry is convinced it is a good idea to consider these types of options in order to best align the incentives of employees and shareholders, but he is concerned about how his choices may affect the compensation expense recorded on the income statement. He sits down and lays out the four scenarios below:

Scenario 1: Service condition only

Grant 500,000 options with a five-year life that may be exercised after a three-year vesting period has elapsed.

Scenario 2: Service condition and performance condition on number of options

Grant 500,000 options with a five-year life that may be exercised after a three-year vesting period has elapsed. If cumulative EPS growth over the three years exceeds 20%, the number of options granted will increase by 20%. If the cumulative EPS growth over the three years is below 5%, the number of options granted will be decreased by 20%. If the cumulative EPS growth over the three years is between 5% and 20%, the number of options will stay at the original grant.

Scenario 3: Service condition and performance condition on exercise price

Grant 500,000 options with a five-year life that may be exercised after a three-year vesting period has elapsed. If cumulative EPS growth over the three years exceeds 20%, the exercise price of the options will be reduced by $5. If the cumulative EPS growth over the three years is below 5%, the exercise price of the options will be increased by $5. If the cumulative EPS growth over the three years is between 5% and 20%, the exercise price of the options will stay at the original strike price.

Scenario 4: Service condition and market-indexed exercise price

Grant 500,000 options with a five-year life that may be exercised after a three-year vesting period has elapsed. Each year the exercise price will be increased or decreased in proportion to the return on the S&P 500 index.

REQUIRED:

You are Curry's newest staff member, a recent graduate from a prestigious Master of Accounting program. Calculate the amount of compensation expense for each of the three years for each of the four scenarios described in the case. Reference FASB Codification Topic 718 to determine how to do these calculations. Use the option valuation models provided by your instructor to perform your option valuations.

Note: The FASB Codification is available on the FASB website: www.fasb.org. Access to the codification requires a password; academic access is available. Alternatively, SFAS No. 123R is available directly on the FASB website under Pre-Codification Standards at http://www.fasb.org/jsp/FASB/Page/PreCodSectionPage&cid=1218220137031.

EXHIBIT 2

VALUATION ASSUMPTIONS

Assumptions at the Date of Grant

A number of assumptions must be made to perform the option valuations at the date of grant. Curry tells you to assume the following:

- Assume the stock price is $58.00 on the date of grant.
- Assume the options in scenarios 1, 2, and 3 are granted at-the-money, so the strike (exercise) price is also $58.00.
- Assume the options in scenario 4 are also granted at-the-money, but the strike price is tied to the S&P index. Further assume the S&P 500 index is trading at $1,450 at the date of grant. Under these assumptions, the strike (exercise) price of the indexed options is set at 4% of the S&P index. Note that on the date of grant, the exercise price is $58.00.
- On the date of grant, assume the expected future volatility of the underlying stock price is 40%. This volatility is based on the calculated historical standard deviation of the company's stock returns over a recent period, adjusted for atypical events.
- On the date of grant, assume the expected future volatility of the S&P 500 index is 20%. This volatility is based on the calculated historical standard deviation of the index over a recent period, adjusted for atypical events. Also assume the correlation of the company stock price and the index is 85%.
- On the date of grant, assume the expected future risk-free interest rate is 2%. This rate is based on U.S. Treasury zero-coupon issues matching the expected life of the options.
- On the date of grant, assume the expected future dividend payout rate (i.e., yield) is 1%.
- On the date of grant, assume the expected option term is equal to the vesting period. In other words, assume the employees will exercise their options as soon as the options vest. But some employees will likely leave the company before the options vest. Information to adjust for these employees is provided below.

Assumptions as of the End of Future Reporting Periods

Additional data will be gathered and additional assumptions will be made at the end of each reporting period. However, the current analysis is being conducted in order to select a stock option design. Thus, for purposes of this analysis, and with an eye toward showing the potential for volatility in compensation expense, Curry tells you to also assume the following:

- Regarding employee retention, assume that:
  - as of the end of the 1st year, 97% of the options will remain outstanding;
  - as of the end of the 2nd year, 95% of the options will remain outstanding;
  - as of the end of the 3rd year, 92% of the options will remain outstanding.
- Regarding expectations of the EPS growth, assume that
  - as of the end of the 1st year, cumulative EPS growth will be 20%;
  - as of the end of the 2nd year, cumulative EPS growth will be 4%;
  - as of the end of the 3rd year, cumulative EPS growth will be 10%.
- Regarding expectations of the future stock price, assume that
  - the stock price will be $62 at the end of the 1st year;
  - the stock price will be $54 at the end of the 2nd year;
  - the stock price will be $59 at the end of the 3rd year.
- Regarding expectations of future volatility, assume that
  - the expected volatility as of the end of the 1st year is 45%;
  - the expected volatility as of the end of the 2nd year is 48%;
  - the expected volatility as of the end of the 3rd year is 52%.

CONCLUSION

We believe this case provides an excellent context in which to learn about creative types of employee stock options, apply option valuation models, and directly interpret accounting standards using the actual text. Our students found the case intrinsically interesting and responded very positively to its use. We hope that others will benefit from using this case in their own courses, and would appreciate any feedback other instructors would care to share with us.

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TEACHING SUGGESTIONS

We wrote this case for the core financial accounting module in our Master of Accounting Program. We require students to prepare the case in advance and allocate approximately 80 minutes of class time to the case. The case can be assigned with no introduction to more advanced students. If the instructor wishes to first introduce the accounting guidance, we recommend walking the students through Codification Topic 718 (sections listed below) and creating a table like the one in Exhibit 3 to summarize the guidance.

In general, Codification Topic 718 (SFAS 123R) is written with a focus on calculating the cost related to granting employee stock options and then allocating that cost to compensation expense over the periods benefited. Total compensation cost can be described as P*Q, where P is the fair value of the stock option and Q is the number of options. The accounting guidance addresses when P and Q should be measured and which P and Q to choose. This case focuses on the specific guidance related to service conditions, performance conditions, and market conditions.

Service conditions require employees to provide their services for a certain time period before the options vest; these conditions typically only affect the number of options that eventually vest (i.e., Q). Performance conditions tie some aspect of the option to meeting performance goals, such as achieving a certain EPS growth. As such, performance conditions may affect P or Q. Market conditions tie option exercise or the option's exercise price to the share price or the price of a market index. Market conditions should be reflected in P.

For conditions affecting Q, the best estimate of Q at each reporting date is multiplied by the relevant P to obtain total compensation cost. It is critical that the students understand the difference between total compensation cost (the total amount to eventually be expensed over all years) and yearly compensation expense. It is also important to note that the total compensation cost in the final year should reflect the actual outcome of Q (the number of options that eventually vest).

For service and performance conditions affecting P, values of P are estimated at the grant date for each potential outcome (i.e., multiple values of P are estimated). Then the P reflecting the outcome most likely to occur is selected at each reporting period and multiplied by the relevant Q to get total compensation cost (i.e. a different P may be chosen each period if the expected outcome changes). It is important to stress to the students that *all* fair values are estimated at the date of grant and fair values used in subsequent periods are not re-estimated.

In contrast, for market conditions affecting P, a single value of P is estimated at the grant date.

EXHIBIT 3

Interpretation of Accounting Guidance

SELECTING P & Q PER CODIFICATION TOPIC 718 (SFAS NO. 123R)	CHOICE OF P SPECIFY HOW AND WHEN TO DETERMINE P AND HOW TO DEAL WITH ANY ADJUSTMENTS	CHOICE OF Q SPECIFY HOW AND WHEN TO DETERMINE Q AND HOW TO DEAL WITH ANY ADJUSTMENTS
SERVICE CONDITION	*Single value of P estimated at grant date. (ASC 718-10-30-15)*	*Select best estimate of Q each period and adjust total compensation cost each period to reflect this. (ASC 718-10-35-3)*
PERFORMANCE CONDITION—ON Q	*Single value of P estimated at grant date. (ASC 718-10-30-15)*	*Select best estimate of Q each period and adjust total compensation cost each period to reflect this. (ASC 718-20-55-35to40)*
PERFORMANCE CONDITION—ON P	*Estimate multiple values of P at grant date. Each period select the value of P that reflects the most probable outcome and adjust total compensation cost each period. (ASC 718-10-30-15; ASC 718-20-55-41to46)*	*Use single value of Q (but service conditions are usually also present and the above would apply).*
MARKET CONDITION	*Estimate single value of P at grant date, incorporating market conditions into the model.(ASC 718-20-55-51to60)*	*Use single value of Q (but service conditions are usually also present and the above would apply).*

Appendix A provides examples of how to program standard option pricing models into Excel. Appendix B uses these models to value the stock options and then shows the detailed calculations for compensation expense each year under the four scenarios. The inputs to the valuation models are the current stock price (S), the strike or exercise price (X), the time to expiration (T) (which in the case of employee stock options is the vesting period), the standard deviation of the company's stock return (Vs), the expected risk free rate of return (Rf), and the expected dividend yield (D). Additional inputs to the indexed option valuation model include the standard deviation of the index returns (Vi) and the correlation between the company stock returns and the index returns (ρ). Students should be able to identify each of these parameters from the information given in the case.[1]

The summarized solutions are presented in Exhibit 4:

EXHIBIT 4

Summary of Case Solutions

Scenario 1	Scenario 2	Scenario 3	Scenario 4
Expense for Year 1: $2,565,599	Expense for Year 1: $3,078,719	Expense for Year 1: $2,874,371	Expense for Year 1: $1,656,549
Expense for Year 2: $2,459,801	Expense for Year 2: $941,601	Expense for Year 2: $1,616,985	Expense for Year 2: $1,588,237
Expense for Year 3: ($290,944)	Expense for Year 3: $201,016	Expense for Year 3: ($65,671)	Expense for Year 3: ($187,856)

Evidence of Efficacy

Student involvement has been an integral part of the development of this case at every stage. An advanced undergraduate student was involved as a research assistant in the early development of the case, and assisted in researching the accounting standards. This involvement was extremely helpful, as we were able to see what difficulties (in fact, very few!) this student encountered in conducting the research.

Before our first use of the case in class, two recent graduates from our Master of Accounting Program tested the case, documenting specific areas where they had difficulty, as well as how long it took them to complete the different questions in the case. They found that building the Black-Scholes model did not present difficulties and should be easily manageable for all students to build, if the instructor desires. Note that this is likely due to the formulas for the Black-Scholes model being relatively easy to program into an excel spreadsheet and not because the theoretical basis for this model is more straightforward!

After our classroom implementation of the case, we obtained feedback from the participating students by requesting their comments (for which they received extra-credit points). Students responded that the case definitely aided their understanding of the accounting for employee stock option accounting. The students also had many helpful comments about where they had difficulty in completing the numerical calculations.

[1] Note that the expectations of the future stock prices and the future volatility presented in Exhibit 2 are not used in any calculations.

APPENDIX A: VALUATION MODELS

Panel A: Black Scholes Model (Black and Scholes 1973)

Inputs	Variable	Enter data
Stock price	S	$ 25.00
Strike (exercise) price	X	$ 25.00
Expected years to expiration	T	3
Standard deviation of stock returns	Vs	60.0%
Expected risk-free rate	Rf	2.5%
Expected dividend yield	D	0.5%
Fair value of call option†		$ 10.21

*†Formula for fair value of call option = PV(S)*N(d1)-PV(X)*N(d2)*

Intermediate Calculations		*Formula*
PV(S)	$24.63	*=PV(D/4,T*4,,-S)*
PV(X)	$23.20	*=PV(Rf/4,T*4,,-X)*
d1	0.577	*=(LN(PV(S)/PV(X))/(Vs*SQRT(T))+(Vs*SQRT(T))/2*
N(d1)	0.718	*=NORM.S.DIST(d1,TRUE)*
d2	-0.462	*=(LN(PV(S)/PV(X))/(Vs*SQRT(T))-(Vs*SQRT(T))/2*
N(d2)	0.322	*=NORM.S.DIST(d2,TRUE)*

Panel B: Fisher-Margrabe Model (Fischer 1978; Margrabe 1978)

Inputs	Variable	Enter data
Stock price	S	$ 25.00
Strike price (4% of S&P index price)	X	$ 25.00
Expected years to expiration	T	3
Standard deviation of stock returns	Vs	60.0%
Standard deviation of index returns	Vi	30.0%
Correlation of S and X returns	ρ	80.0%
Expected risk-free rate	Rf	2.5%
Expected dividend yield	D	1.5%
Fair value of call option†		$ 6.42

*†Formula for fair value of call option = PV(S)*N(d1)-PV(X)*N(d2)*

Intermedicate Calculations		*Formula*
PV(S)	$23.90	*=PV(D/4,T*4,,−S)*
PV(X)	$23.20	*=PV(Rf/4,T*4,,−X)*
V	16.2%	*=$Vs^2+Vi^2-2*Vx*Vi*\rho$*
d1	0.740	*=(LN(PV(S)/PV(X))+V*T)/(SQRT(V)*SQRT(T))*
N(d1)	0.770	*=NORM.S.DIST(d1,TRUE)*
d2	0.043	*=d1−SQRT(V)*SQRT(T)*
N(d2)	0.517	*=NORM.S.DIST(d2,TRUE)*

APPENDIX B: CASE SOLUTIONS

Scenario 1: Service condition only

Inputs	**Variable**	**Enter data**		Intermediate Calculations	
Stock price	S	$ 58.00		PV(S)	$56.29
Strike (exercise) price	X	$ 58.00		PV(X)	$54.63
Expected years to expiration	T	3		d1	0.390
Standard deviation of stock returns	Vs	40.0%		N(d1)	0.652
Expected risk-free rate	Rf	2.0%		d2	-0.303
Expected dividend yield	D	1.0%		N(d2)	-0.381
Fair value of call option at grant		$ 15.87			
Allocation of Compensation Expense	**Year 1**	**Year 2**	**Year 3**		
BS value of stock option (P)	$ 15.87	$15.87	$15.87		
Number of stock options granted (Q)	500,000	500,000	500,000		
% vest	97%	95%	92%		
Total Compensation Cost	7,696,798	7,538,101	7,300,056		
Proportion recognized to date	33%	67%	100%		
Total Compensation Expense to date	2,565,599	5,025,401	7,300,056		
Compensation Expense each year	2,565,599	2,459,801	(290,944)		

Scenario 2: Service condition and performance condition on number of options

Inputs	Variable	Enter data		Intermediate Calculations	
Stock price	S	$ 58.00		PV(S)	$56.29
Strike (exercise) price	X	$ 58.00	***	PV(X)	$54.63
Expected years to expiration	T	3		d1	0.390
Standard deviation of stock returns	Vs	40.0%		N(d1)	0.652
Expected risk-free rate	Rf	2.0%		d2	-0.303
Expected dividend yield	D	1.0%		N(d2)	-0.381
Fair value of call option at grant		**$ 15.87**			
Allocation of Compensation Expense	**Year 1**	**Year 2**	**Year 3**		
BS value of stock option (P)	$ 15.87	$ 15.87	$ 15.87		
Number of stock options granted (Q)	600,000	400,000	500,000	***	
% vest	97%	95%	92%		
Total Compensation Cost	9,236,158	6,030,481	7,300,056		
Proportion recognized to date	33%	67%	100%		
Total Compensation Expense to date	3,078,719	4,020,321	7,300,056		
Compensation Expense each year	3,078,719	941,601	201,016		

APPENDIX B (continued): VALUATION MODELS

Scenario 3: Service condition and performance condition on exercise price

Inputs	**Variable**	**Enter data**		Intermediate Calculations	
Stock price	S	$ 58.00		PV(S)	$56.29
Strike (exercise) price	X	$ 58.00	***	PV(X)	$54.63
Expected years to expiration	T	3		d1	0.390
Standard deviation of stock returns	Vs	40.0%		N(d1)	0.652
Expected risk-free rate	Rf	2.0%		d2	-0.303
Expected dividend yield	D	1.0%		N(d2)	-0.381
Fair value of call option at grant		**$ 15.87**			

Inputs	**Variable**	**Enter data**		Intermediate Calculations	
Stock price	S	$ 58.00		PV(S)	$56.29
Strike (exercise) price	X	$ 53.00	***	PV(X)	$49.92
Expected years to expiration	T	3		d1	0.520
Standard deviation of stock returns	Vs	40.0%		N(d1)	0.698
Expected risk-free rate	Rf	2.0%		d2	-0.173
Expected dividend yield	D	1.0%		N(d2)	-0.431
Fair value of call option at grant		**$ 17.78**			

Inputs	**Variable**	**Enter data**		Intermediate Calculations	
Stock price	S	$ 58.00		PV(S)	$56.29
Strike (exercise) price	X	$ 63.00	***	PV(X)	$59.34
Expected years to expiration	T	3		d1	0.270
Standard deviation of stock returns	Vs	40.0%		N(d1)	0.606
Expected risk-free rate	Rf	2.0%		d2	-0.423
Expected dividend yield	D	1.0%		N(d2)	-0.336
Fair value of call option at grant		**$ 14.18**			

Allocation of Compensation Expense	**Year 1**	**Year 2**	**Year 3**
BS value of stock option (P)	$ 17.78	$ 14.18	$ 15.87
Number of stock options granted (Q)	500,000	500,000	500,000
% vest	97%	95%	92%
Total Compensation Cost	8,623,113	6,737,033	7,300,056
Proportion recognized to date	33%	67%	100%
Total Compensation Expense to date	2,874,371	4,491,356	7,300,056
Compensation Expense each year	2,874,371	1,616,985	(65,671)

APPENDIX B (continued): VALUATION MODELS

Scenario 4: Service condition and market-indexed exercise price

Inputs	Variable	Enter data
Stock price	S	$ 58.00
Strike price (4% of S&P index price)	X	$ 58.00
Expected years to expiration	T	3
Standard deviation of stock returns	Vs	40.0%
Standard deviation of index returns	Vi	20.0%
Correlation of S and X returns	ρ	85.0%
Expected risk-free rate	Rf	2.0%
Expected dividend yield	D	1.0%
Fair value of call option at grant		$ 10.25

Intermedicate Calculations	
PV(S)	$56.29
PV(X)	$54.63
V	6.4%
d1	0.506
N(d1)	0.694
d2	0.068
N(d2)	-0.527

Allocation of Compensation Expense	**Year 1**	**Year 2**	**Year 3**
BS value of stock option (P)	$ 10.25	$ 10.25	$ 10.25
Number of stock options granted (Q)	500,000	500,000	500,000
% vest	97%	95%	92%
Total Compensation Cost	4,969,646	4,867,179	4,713,479
Proportion recognized to date	33%	67%	100%
Total Compensation Expense to date	1,656,549	3,244,786	4,713,479
Compensation Expense each year	1,656,549	1,588,237	(187,856)

NOTES